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(30)Priority

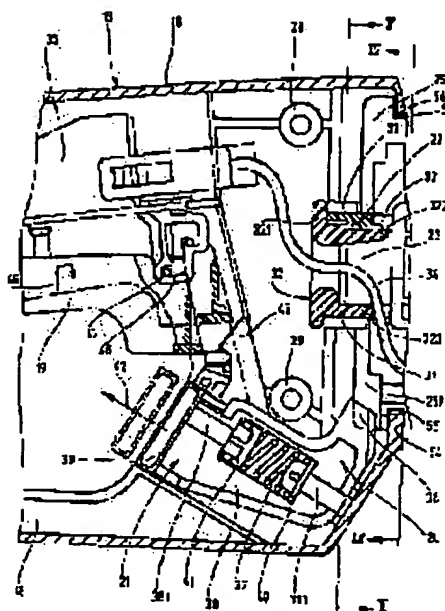
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(54) HANDHELD MACHINE TOOL

(57)Abstract:

PROBLEM TO BE SOLVED: To cause the relative turn of a handle and a motor casing by means of a structure that is inexpensive in terms of fabrication techniques and to allow split support shells to be molded simultaneously and integrally during the injection process of handle shell that is manufactured normally from plastics.

SOLUTION: In a handheld machine tool, split support shells 30, 31 are formed integrally with handle shells 151, 152 and are turnably attached to a support pin 22, a bag hole 23 is formed in the end face of the support pin, and a sleeve 32 is inserted into the bag hole, is engaged with the support pin and with the concentric ends of the split support shells by means of a radial flange 321 formed at the end face, and is locked with either an end separate from the radial flange or, by means of a snap hook 322 formed near the end, a radial notch 33 in the support pin.



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CLAIMS

[Claim(s)]

[Claim 1] It has motor casing (11) which is a stock tool machine and receives the electric motor-type driving gear for a tool. Motor casing holds the central bearing pin (22) to the tool and reverse side. It has the handle (15) which is attached in this bearing pin rotatable and consists of two half-segmented shell (151,152). The handle has covered the end face of motor casing (11), and it has the switch strip (19) for actuation of an electric switch (35). Said switch is connected to the electric motor-type driving gear through the electric interconnection cable (34) guided through the bearing pin (22) for switch-on of this driving gear, and switch-off. It has the locking device (20) for specifying a handle (15) in at least two different relative rotation locations to motor casing (11). In the thing of a format which has the manual operating member by which the locking device has been arranged at the handle (15) Bearing half-segmented shell (30 31) is really fabricated to each handle shell (151,152). Bearing half-segmented shell is attached in the bearing pin (22) rotatable. The sac hole (23) is formed in the end face of a bearing pin (22), and the sleeve (32) is inserted in the sac hole (23). With, it is engaging with the said alignment-edge of a bearing pin (22) and bearing half-segmented shell (30 31). the radial flange (321) by which the sleeve was formed in the end-face side -- the edge of the side which is separated from a radial flange -- or the snap hook (322) formed near this edge -- with, the stock tool machine characterized by having stopped in the radial notch (33) of a bearing pin (22).

[Claim 2] At least one radial slit (24) which has given to the end face of a bearing pin (22) to the sac hole pars basilaris ossis occipitalis advantageously, and carries out opening to it in a sac hole (23) is formed. The interconnection cable (34) is guided through the radial slit (24) and the sleeve (32). The stock tool machine according to claim 1 with which at least one radial adjunct (323) to which a sleeve (32) is engaged in a radial slit (24) is held, and the adjunct is fixing the interconnection cable (34) to the pars basilaris ossis occipitalis of a radial slit (24).

[Claim 3] Stop projection [to which the locking device (20) was held possible / motion in a handle (15) / , and was connected with the operating member (21) / one] (36) Reach. It has at least two notches (27) formed in motor casing (11) in order to receive a stop projection (36) in configuration association at least in the hoop direction of motor casing (11). Mutually [a notch], advantageously, shift only the 90 degrees only of the advantageously same rotation include angles, and they are arranged in a hoop direction, respectively. The stock tool machine according to claim 1 or 2 on which the spring force which turns a stop projection (36) in a notch (27), and carries out a load to a stop projection (36) or an operating member (21) is acting.

[Claim 4] The stock tool machine according to claim 3 with which it is formed with two ribs (251,252) with which the notch (27) kept parallel spacing mutually [rib pair (25)], respectively, and has been arranged, and the rib is prolonged from the perimeter of a bearing pin (22) to the radial outside in the inside of motor casing (11).

[Claim 5] An adjoining rib (251,252) in the hoop direction of motor casing (11) of rib pair (25) which continues one by one It is mutually combined by the said alignment ring segment (26) to the bearing pin axis. The stock tool machine according to claim 4 arranged so that the height of the direction of an axis of a ring segment may **** in rib height and a ring segment (26) may contact a stop projection (36) to a ring segment in the rotation field between [of two] rib pair (25).

[Claim 6] The operating member (21) is arranged near the switch strip (19), and have the stop element

(43), and a stop element collaborates with a switch strip (19). Actuation of an operating member (21) is locked by the switch on position of a switch strip (19). And the stock tool machine of claims 3-5 given in any 1 term with which migration of the switch strip from the switch off position of a switch strip (19) to switch on position is locked for the object of rotation on a knob (15) at the time of actuation of an operating member (21).

[Claim 7] A switch strip (19) raises by longitudinal direction migration of a switch strip (19). The possible switch-on stop section, And have the continuation operation stop section and a switch strip (19) is stopped after switch-on of an electric motor-type driving gear in the continuation operation stop department. The switch strip (19) and the stop element (43) of each other are attached spatially. It is located, so that a stop element (43) may prevent longitudinal direction migration of this switch strip before a switch strip (19) directly after moving an operating member (21) to a handle and a stop discharge location The stock tool machine according to claim 6 located so that a switch strip (19) may prevent migration of this stop element before a stop element (43) directly after moving a switch strip (19) to the continuation operation stop section.

[Claim 8] It is constituted as a slider (38) to which it was shown to the operating member (21) into the handle (15). A part for a grip part (39) is firmly held at the another edge at which the slider holds the stop projection (36) at the one edge, and projects from a handle (15). The stock tool machine of claims 3-7 which the spring force is made to produce with compression spring (37), and compression spring supports on the slider (38) and the handle (15) given in any 1 term.

[Claim 9] It has the bend (17) to which a handle (15) keeps predetermined spacing and covers a switch strip (19). It is arranged so that a slider (38) can be pulled out manually, in order that compression spring (37) and a stop projection (36) may remove a stop projection (36) from a notch (27). The stock tool machine according to claim 8 which projects exceeding a bend (17) on both sides in the shape of a web in order for the amount of (39) grip part to hold.

[Claim 10] It has the bend (17) to which a handle (15) keeps predetermined spacing and covers a switch strip (19). It is arranged so that a slider (38) can be pulled out manually, in order that compression spring (37) and a stop projection (36) may remove a stop projection (36) from a notch (27). The stock tool machine according to claim 8 constituted as a push button (49) with which a part for a grip part (39) was maintained inside the profile of a bend (17).

[Claim 11] Lever (50) of two arms with which the operating member (21) was held possible [turning in a handle (15)] Reach. It has the slide carbon button (51) supported movable in the handle (15). One lever arm of a lever holds the stop projection (36), and the slide carbon button is pivoted by another lever arm of a lever (50) at one edge. It projects from the handle (15) in the other-end section for slider actuation. The stock tool machine of claims 3-7 which the spring force is made to produce with torsion spring (53), and torsion spring supports on the slide carbon button (51) and the handle (15) given in any 1 term.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This inventions are a stock tool machine, especially an angle-type grinding machine in which manual advice is possible. It has motor casing which receives the electric motor-type driving gear for a tool especially grinding, or a cutting plate. Motor casing holds the central bearing pin to the tool and reverse side. It has the handle which is attached in this bearing pin rotatable and consists of two half-segmented shell. The handle has covered the end face of motor casing, and it has the switch strip for actuation of an electric switch. Said switch is connected to the electric motor-type driving gear through the electric interconnection cable guided through the bearing pin for switch-on of this driving gear, and switch-off. At least two different relative rotation locations to motor casing are equipped with the locking device for specifying a handle, and a locking device is related with the thing of a format which has the manual operating member arranged at the handle.

[0002]

[Description of the Prior Art] The stock tool machine of said format by relative rotation between motor casing and a handle on the other hand, a grinding plate like the grinding located in parallel to the sense, i.e., a switch strip on a knob, at the bottom, and polish, for example And if a cutting plate pulls at a right angle to a tool machine on the other hand, human-engineering-maintenance of a stock tool machine is enabled in each different activity process like cutting of the flagstone located in a right angle to a switch strip. In cutting, a cutting plate is prescribed to be located in right-hand side on a knob or left-hand side.

[0003] In a stock tool machine with the format (the Federal Republic of Germany patent application 4102838A No. 1 description) well-known in order to enable rotation motion of the handle to motor casing stated to the beginning The ring flange of a rotation cross member (Drehkreuz) is received by the bearing pin really formed in the center of motor casing at axis directional movement impossible. The rotation cross member is firmly combined with the handle which consists of two half-segmented shell using two screw threads on which the shell of this handle is summarized. It is one end face, with the ring flange is supported to the ring shoulder of a bearing pin through the slipping plate, is an other-end side, with is prescribed by the clamped plate (Spannteller). The clamped plate is fixed with screws to the free end face of a bearing pin using two screw threads, and the belleville spring is inserted in between the clamped plate and the ring flange. It has three rib pairs which 90 degrees of locking devices shift mutually, respectively and by which they were formed in motor casing, the rib of both rib pairs keeps parallel spacing mutually, and is arranged, and it has extended radially and has the operating member supported by the rotation cross member possible [turning], and an operating member is a stop cam, with it engages with rib internal affairs.

[0004]

[The advantage of invention] Relative rotation with a handle and motor casing is made to be generated according to cheap structure as an advantage by the configuration based on this invention of a stock tool machine according to claim 1 by the fabrication technical target. Bearing half-segmented shell is really simultaneously fabricated on the occasion of the injection process of the handle shell usually manufactured from plastics. Immobilization of the direction of an axis of a bearing pin and bearing shell is performed by the plastics sleeve, and the clip stop of the plastics sleeve is

only chiefly carried out into a sac hole. A rotation cross member, a slipping plate, a clamped plate, a belleville spring, and local area material like two set screws are omitted. Before it ****s both handle shell mutually chiefly for association with motor casing and a handle, the only member, i.e., plastics sleeve, and it also joins together on the occasion of the assembly of a stock tool machine, it is only incorporated. Besides many local area material being reducible, assembly time amount is also shortened remarkably.

[0005] By the means given in a claim dyadic less or equal, the advantageous configuration of a stock tool machine according to claim 1 is possible.

[0006] With the advantageous configuration of this invention, at least one radial slit which has given to the end face of a bearing pin to the sac hole pars basilaris ossis occipitalis advantageously, and carries out opening to it in a sac hole is formed. The interconnection cable between an electric motor-type driving gear and an on/off switch is guided through a radial slit and a sleeve, it is being fixed to the pars basilaris ossis occipitalis of a radial slit by the radial adjunct of a sleeve, and the adjunct is being engaged in a radial slit. By carrying out the clip stop of the sleeve for immobilization of a bearing pin and bearing shell, the interconnection cable guided through the center of a bearing pin and a sleeve is being simultaneously pushed and fixed to the pars basilaris ossis occipitalis of a sac hole.

[0007] one stop projection to which the locking device was held possible [motion in a handle], and was connected with the operating member based on the advantageous configuration of this invention -- and It has at least two notches formed in motor casing in order to receive a stop projection in configuration association at least in the hoop direction of motor casing. Mutually [a notch], only the advantageously same rotation include angle is shifted, it is arranged, and the spring force which turns this stop projection in a notch and carries out a load to a stop projection is acting in a hoop direction. By such configuration, a stock tool machine function is improved based on stopping a handle automatically and locking it in the notch to which only the same include angle was shifted.

[0008] Based on another configuration of this invention, advantageously, the stop projection which the operating member is constituted as a slider, and the slider was pulled in the alternative embodiment of this invention, was pressed, therefore was firmly combined with the slider resists the return force of a spring, it is raised from a notch, and, subsequently a handle is rotated. When an operating member is detached, a stop projection is carried on a radii segment under the spring force, and the radii segment is prolonged in between notches and makes a stop projection enter in one notch automatically at the termination of rotation motion on a knob.

[0009] With the advantageous configuration of this invention, the operating member is arranged near the switch strip, and it has the stop element, a stop element collaborates with a switch strip, and actuation of an operating member is locked by the switch on position of a switch strip, and migration of the switch strip from the switch off position of a switch strip to switch on position is locked for the object of rotation on a knob at the time of actuation of an operating member. Such a configuration contributes to the safety of an activity remarkably, and it is because it is certainly avoided by said configuration that it carries out switch-on of the electric motor-type driving gear in the state of a thing which carries out stop discharge of the handle during a revolution of an electric motor-type driving gear, or stop discharge conversely on a knob.

[0010]

[Embodiment of the Invention] The electric angle-type grinding machine (Winkelschleifmaschine) which is shown in drawing 1 as an example for a common stock tool machine (Handwerkzeugmaschine) and in which manual advice is possible It has motor casing. To one end face of motor casing The transmission head 12 equipped with the actuation spindle 13 with which it projects for the grinding plate (Schleif-scheibe) 14 is arranged at immobilization. And the handle 15 is arranged pivotable considering the motor casing axis as a core at another end face, and the seal is carried out so that the end face of the motor casing 11 may not let dust pass mostly. The handle 15 consists of the shank grip (Stielgriff) 16 held by the hand, and the bend 17 with which one was equipped during the activity of an angle-type grinding machine, and a bend is prolonged in the shank grip 16 bottom, and it forms the penetration opening 18, and it has covered it so that the finger located around the shank grip 16 during the activity of an angle-type grinding machine may be protected to the bottom. The switch strip 19 is made to have projected into the penetration opening 18 from the bottom turned to

the bend 17 of the shank grip 16, a switch strip operates the on/off switch for an electric drive motor, and the drive motor is attached in the motor casing 11. In the motor casing 11, the rotatable handle 15 is specified in three rotation locations which are different to the motor casing 11 using a locking device 20. In the relative position shown in drawing 1 of the motor casing 11 and a handle 15, an angle-type grinding machine is used for polish or grinding. In this relative position, the grinding plate 14 is mostly located in parallel to the switch strip 19. this relative position to a handle 15 or the motor casing 11 — 90 degrees — left-hand side — or an angle-type grinding machine is prepared by making it rotate to right-hand side for a "cutting" working stroke. In this activity location, to the handle 15, only the motor casing 11 and 90 degrees of transmission heads 12 are rotated, and the grinding plate (now cutting plate) 14 occupies the location shown in drawing 1 with a broken line, and is mostly turned to the right angle to the switch strip 19. Release of a locking device 20 is performed using an operating member 21, and the operating member is being engaged in a handle 15 or the shank grip 16 by the end-face side which turned to the motor casing 11 of the penetration opening 18 near the switch strip 19.

[0011] The detail of the attaching part to the motor casing 11 in which rotation motion of a handle 15 is possible is shown in the locking device 20 and the list at drawing 3 thru/or drawing 5 . The central bearing pin 22 is really fabricated by the near end face of the transmission head 12 and reverse of the motor casing 11, two radial slits 24 which were mutually suitable in the diameter direction at the sac hole 23 list are formed in the end-face side of a bearing pin, and a radial slit is attained to a sac hole pars basilaris ossis occipitalis, and opening is carried out into the sac hole 23 so that clearly from drawing 3 and drawing 5 . four rib pairs which shifted 90 degrees and have been mutually arranged from the bearing pin 22 -- 25 is prolonged to the radial outside. The rib pair is mutually combined through the said alignment ring segment 26. each — rib pair 25 has the rib 251,252 which keeps spacing mutually and is prolonged in parallel, therefore the notch (Ausnehmung) 27 is formed between ribs, and this notch has accomplished the component of a locking device 20. Similarly the height of the direction of an axis of a rib 251,252 and the ring segment 26 is constituted.

[0012] The handle 15 is constituted by two half-segmented handle shell (haelftig) (Handgriffschale) 151,152, and both handle shell is mutually combined with the screw thread 28 prolonged in a longitudinal direction to motor casing so that clearly from drawing 4 . The lower screw thread 28 is shown in drawing 4 . The screw thread 28 is guided into the side hole 29 with which both handle shell 151,152 agreed mutually. Each handle shell 151,152 is the flange 54 arranged at the end face, with is being engaged in the annular ring groove (drawing 3) of the motor casing 11. The bearing half-segmented shell (Lagerhalbschale) 30 and 31 is really fabricated to each handle shell 151,152, and the bearing pin 22 of the motor casing 11 is equipped with bearing half-segmented shell rotatable. In order to secure the bearing half-segmented shell 30 and 31 to axis directional movement on the bearing pin 22 Have inserted the plastics sleeve 32 in the sac hole 23, and are the radial flange 321 by which the plastics sleeve was formed in the end face, with the said alignment-edge of the bearing pin 22 and the bearing half-segmented shell 30 and 31 is surrounded. and the snap hook (Schnapphaken) 322 formed in the edge of the side which is separated from a flange in one — with, it is engaged in the radial notch 33 of the bearing pin 22. Furthermore, the plastics sleeve 32 holds two radial adjuncts 323 arranged in the diameter direction, and when an adjunct inserts the plastics sleeve 32 into a sac hole 23, it is being engaged in each radial slit 24 of the bearing pin 22. In this case, to the pars basilaris ossis occipitalis of the radial slit 24, the adjunct 323 kept its distance and has finished. It lets the interior of the hollow of the radial slit 24 and the plastics sleeve 32 pass, the electric interconnection cable 34 is guided, and the interconnection cable has connected the actuator of an electric-motor type to the on/off switch 35 of an operational electric type by the switch strip 19. An interconnection cable 34 is fixed to the pars basilaris ossis occipitalis of the radial slit 24, and the pars basilaris ossis occipitalis of a sac hole 23 by the adjunct 323 of the plastics sleeve 32.

[0013] As already stated a locking device 20 -- the inside of an operating member 21 and the motor casing 11 -- a rib pair -- by 25 It has compression spring 37 in the stop projection 36 and list which are attached in four notches 27 and operating member 21 which were formed, and rush into a configuration joint target (formschluessig) into a notch 27 in the hoop direction of the motor casing 11. Compression spring is carrying out the load of the operating member 21, and the stop projection 36 is moved by this into a notch 27 in the inrush direction. In the example of drawing 1 thru/or

drawing 3 , the operating member 21 holds a part for a handle or a grip part 39 at the edge of the front which it is constituted as a slider 38 guided with the advice 381 to the side in a handle 15, and the slider held the stop projection 36 at the back edge, and projected in the penetration opening 18 from the handle 15. On the other hand, compression spring 37 is supported to the spring receptacle 41 which supported to the spring receptacle 40 fixed to the slider, and was fixed to the handle on the other hand. The amount of [39] grip part projects exceeding a bend on both sides of a bend 17, therefore it has grip-come to be easy of the amount of also with a right hand or left hand in human engineering.

[0014] In the location shown in drawing 3 of a locking device 20, the locking device is fixing the handle 15 to the motor casing 11 at rotation impossible. A slider 38 is pushed on right-hand side by drawing 3 R> 3 by compression spring 37, and the stop projection 36 is engaged in configuration association in the rib pair notch 27 formed of 25. In order to release a locking device 20 for the purpose of rotation of a handle 15, a part for a grip part 39 is pulled back to the location shown in the direction of an arrow head 42 with an alternate long and short dash line at drawing 3 . A slider is moved to the left-hand side of drawing 3 by this, and the stop projection 36 is raised from a notch 27. subsequently, the handle 15 -- left-hand side -- or 90 degrees is rotated to right-hand side, and the grinding plate 14 occupies the location shown in drawing 1 with a broken line by this. If a handle 15 is rotated by extent with which the stop projection 36 and a notch 27 do not agree any longer, a part for a grip part 39 will be released. As a slider 38 shows drawing 3 according to the spring force of compression spring 37, it is again moved to right-hand side, and the stop projection 36 contacts one of the ring segments 26. If 90 degrees of handles 15 are rotated, the stop projection 36 will slide down from the ring segment 26, and will enter in a notch 27 in configuration association. A handle 15 is stopped automatically in a new rotation location.

[0015] When the operating member 21 38, i.e., a slider, is equipped with the stop element 43 for positive activity insurance, actuation of a slider 38 is locked when a stop element collaborates with the switch strip 19 and brings the switch strip 19 to switch on position, and operating an operating member 21 for the object of rotation of a handle 15, migration of the switch strip 19 from the switch off position shown in drawing 3 to switch on position is locked. For this reason, the stop element 43 is arranged at one in favor of the upside suitable for the switch strip 19 of a slider 38, and projects in the operating range of the switch strip 19. With the pin slit advice 44, movable in the direction of an axis and turning are possible for the switch strip 19 within the limits of predetermined, and a return spring 45 returns the switch strip 19 to a switch off position in this case so that clearly from drawing 2 . The switch strip 19 is equipped with the switch-on stop section (Einschaltssperre) and the continuation operation stop section (Dauerlauf-Arretierung) with the slider advice 46 (drawing 3) to which it shows the slider pin 47 which projects at a right angle from the switch strip 19 to the interior and which was specified by the handle side. The location the switch strip 19 is moved from the switch (continuous line has shown this to drawing 3)-on stop section to which the slider pin 47 is located in the slider advice 46 bottom to continuation operation stop circles by the slide and stroke-motion shown by the arrow head 48, and it is located to the slider advice 46 upside in the slider pin 47 at the continuation operation stop section, and are shown with an alternate long and short dash line to drawing 3 in the switch strip 19 is occupied. As an arrow head 48 shows, subsequently it is raised upwards, and the switch strip 19 continues, is slid [the inside of the pin slit advice 44 is first slid by the longitudinal direction, and] to a longitudinal direction in the still more nearly same direction, subsequently is released, and is specified in the continuation operation stop section.

[0016] In the stop location shown in drawing 3 of a slider 38 as a continuous line, the stop element 43 occupies the location shown in drawing 3 as a continuous line. If a slider 38 is pulled in the direction of an arrow head 42, the stop element 43 will shift to the location shown in drawing 3 by the broken line in the stop discharge location of a locking device 20. When the switch strip 19 is in a switch off position (a continuous line shows to drawing 3), where a part for a grip part 39 is lengthened (an alternate long and short dash line shows to drawing 3 R> 3), the stop element 43 is directly located before the end face of the switch strip 19. Longitudinal direction migration of the switch strip 19 is locked by this, and switch-on of the electric drive motor is not carried out. Conversely, when the switch strip 19 is in the continuation operation stop section after switch-on of an electric drive motor, a switch strip 19 occupies the location shown with an alternate long and short dash line to

drawing 3 , the end face of the switch strip 19 is before the stop element 43 directly in this location, this stop element is in the criteria location shown in drawing 3 as a continuous line, and a locking device 20 has combined a handle 15 with motor casing 11 in this criteria location at rotation impossible. Now, if an operator is going to pull a part for a grip part 39 for the object of stop discharge of a locking device 20, the stop element 43 contacts the end face of the switch strip 19 promptly, and locks migration of a slider 38, as a result stop discharge of a locking device 20.

[0017] Two handles 15 equipped with the locking device 20 which changed to drawing 6 and drawing 7 are shown roughly. Similarly the operating member 21 is constituted as a slider 38, and the slider is guided possible [axis directional movement] into the handle 15, and holds the stop projection 36 at the one edge. The slider 38 is maintained inside the profile of the side of a bend 17, although the push button 49 is held at the another edge and the push button projects in the penetration opening 18. on the other hand, compression spring 37 supports to a slider 38, and, on the other hand, supports on a handle 15, it is relatively arranged to the stop projection 36, and compression spring 37 binds tight by pushing of the push button 49 into a handle 15 — having — the stop projection 36 — a rib pair — it extrudes from the notch 27 formed of 25.

[0018] In the locking device 20 incorporated in the handle 15 shown in drawing 7 , it has the lever 50 of two arms with which the operating member 21 was supported possible [turning] in the handle 15, and, as for this lever, the stop projection 36 is held at the edge of one lever arm. Another lever arm of a lever is made to have pivoted the slide carbon button 51, and the slide carbon button is guided possible [the Nagate directional movement] into the pin slit advice 52 of the bend 17 of a handle 15, and projects in the penetration opening 18. Torsion spring 53 is attached in the pivoting point of a lever 50 and the slide carbon button 51, and, on the other hand, this torsion spring supports on a lever 50, and, on the other hand, it supports on the slide carbon button 51, and the load of the lever 50 is carried out in the direction of a clockwise rotation by drawing 7 , consequently the stop projection 36 enters in a notch 27. If the slide carbon button 51 is moved to right-hand side by drawing 7 , a lever 50 will be revolved by drawing 7 in the anticlockwise direction to the location shown with a broken line, consequently the stop projection 36 will be removed from a notch 27, and stop discharge of the locking device 20 will be carried out.

[0019] This invention is not limited to the example of a graphic display, and the sac hole 23 may be constituted within the limit of this invention as a breakthrough.

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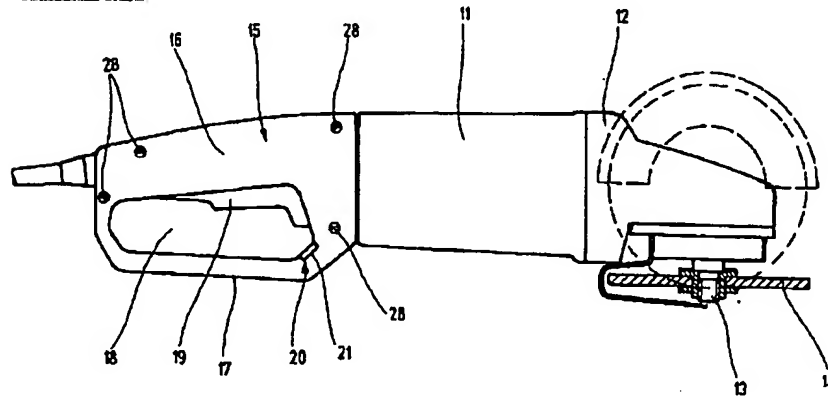
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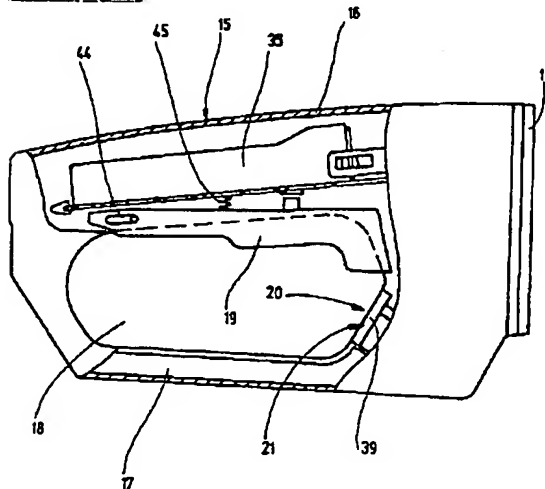
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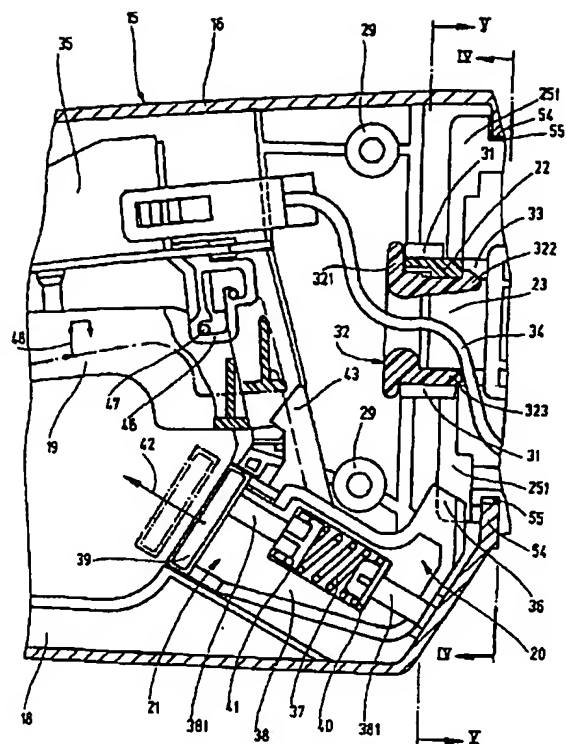
[Drawing 1]



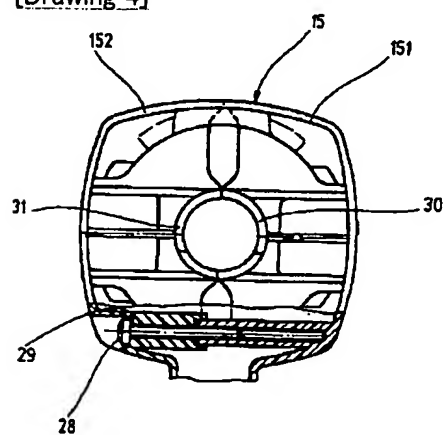
[Drawing 2]



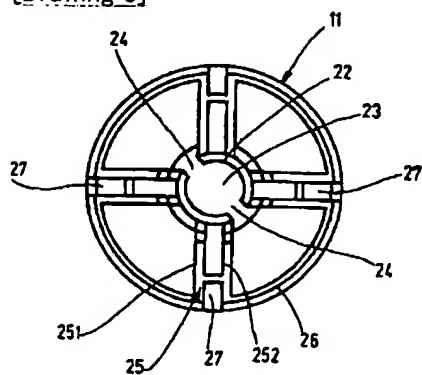
[Drawing 3]



[Drawing 4]



[Drawing 5]



[Drawing 6]

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